

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of )  
Funakubo *et al.* )  
Application Number To be assigned )  
Filed: Concurrently Herewith )  
For: POLYGON DRAWING APPARATUS AND )  
METHOD, AND STORAGE MEDIUM FOR )  
IMPLEMENTING THE SAME METHOD )

Honorable Assistant Commissioner  
for Patents  
Washington, D.C. 20231

**PRELIMINARY AMENDMENT**

Sir:

This is a continuation application of U.S. Application No. 09/112,151 filed on July 9, 1998. The period for response to the office action dated February 20, 2001 regarding U.S. Application No. 09/112,151 has been extended to expire on August 20, 2001 with a three-month extension fee included herewith. Prior to an examination on the merits, please amend the continuation application as follows:

**IN THE SPECIFICATION:**

Please insert before the first paragraph under **BACKGROUND OF THE INVENTION** of page 1 of the Disclosure currently on file with the following paragraph:

This application is a continuation of U.S. Application No. 09/112,151 filed on July 9, 1998.

## REMARKS

Applicant has incorporated the pending claims 1-31 (now claims 1-42) after all multiple dependant claims being divided into single dependant claims), specification, and abstract in the co-pending U.S. Application 09/112,151 filed on July 9, 1998 with new claims 43-84. Applicant submits that no new matter has been added to the continuation application.

In particular, new claims 43-84 are patentably distinguish from U. S. Pat. No. 5,625,768 to Dye (hereinafter "Dye"). Applicants contend that Dye as recited in the outstanding Office Action does not teach or suggest an intensity value which changes gradually on each edge of a triangle (Figs. 5, 6, 29; lines 3-7, page 26) but keeps constant inside the triangle as in the present invention. In contrast, the intensity value inside the triangle in Dye (Figs. 4, 8A & 8B) changes gradually ("In this manner, adjacent pixels have consistent intensity differentials, resulting in smoother transitions and no banding effect" col. 30, lines 1-3). Although Dye inherently interpolates the intensity value by the error value on each edge of the triangle, which makes the intensity values on the edges change gradually as well, the intensity value inside the triangle in Dye is not constant but changes gradually.

Based upon the same rational, although Dye also provides two reference points, the alleged second reference point (midpoint) 404 in Dye is related to an intensity value gradually changing inside a triangle rather than on each edge of the triangle. On the other hand, the present invention provides a gradually changing intensity on each edge of a triangle related to two reference points, such as Xri, XRe in Figs. 5-6 or XRir (=1), XRer (=0) in Figs. 8A-8B.

Lastly, the lattice points XLe, XLi, XRe, XRe of the present invention are points on displayed grid boxes located immediately inside the real intersections of the scan line with the edges rather than right on the real intersections (edges) (lines 16-25, page 25). For example, Xri in Fig. 5 falls outside of the diamond box, so does Xli in Fig. 6. In particular, different methods/equations (depending on the relative slopes of the right and left edges) are employed for obtaining the respective coordinate values and intensity values of each of the four lattice points (Figs. 7A-B, 8A-B; lines 13-32, page 26). Such lattice points and edge calculating methods are simply absent from Dye.

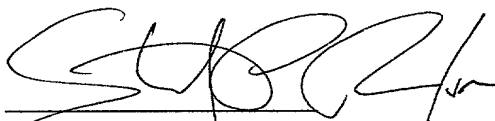
To sum up, the "intensity value generating device" or the "intensity value generating step" as now recited in claims 43, 51-53, 65-72, 79-81 encompasses the above-mentioned distinctive features which are not taught or suggested by Dye.

Accordingly, independent claims 43, 51-53, 65-72, 79-81 from which claims 44-50, 54-64, 73-78, 82-84 depend have been amended to highlight the supporting arguments. In view of all the above, clear and distinct differences as discussed exist between new claims 43-84 and Dye

the prior art reference upon which the rejections in the Office Action rely. Applicants respectfully contend that the prior art references cannot anticipate the present invention or render the present invention obvious. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

The Examiner is respectfully requested to give due consideration to this application, to indicate the allowability of the claims, and to pass this case to issue. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicant's undersigned representative at the address and phone number indicated below.

Respectfully submitted,



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**August 20, 2001**  
SPF/JCM/JT

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**PRELIMINARY AMENDMENT**

Sir:

Prior to the examination of the above-referenced application, the Examiner is respectfully requested to amend this application as follows:

**IN THE CLAIMS:**

Please amend the claims as follows:

In claim 3, line 2, please delete "or claim 2".

In claim 4, line 2, please delete "or 2".

In claim 10, line 2, please delete "or claim 9".

In claim 11, line 2, please delete "or claim 9".

In claim 14, line 2, please delete "or claim 9".

In claim 23, line 2, please delete "or 22".

In claim 24, line 2, please delete "or 22".

In claim 25, line 2, please delete "or 22".

Please add the following new claims to the application:

--29. A polygon drawing method according to claim 22, wherein the intensity value is determined by a ratio of an intensity value of a pixel that is to be drawn, to an intensity value of a pixel that is originally located at a position where the pixel to be drawn exists, and wherein

when said control bit indicates that each edge of the triangles is not to be drawn, the intensity value of the pixel to be drawn is set to 0.

30. A polygon drawing method according to claim 22, wherein the intensity value is determined by a ratio of an intensity value of a pixel that is to be drawn to an intensity value of a pixel that is originally located at a position where the pixel to be drawn exists, and wherein

when said control bit indicates that the intensity processing is not to be performed on said each edge of each of the triangles, the intensity value of the pixel to be drawn is set to 1.

31. A polygon drawing method according to claim 22, further comprising:

an edge calculating step of deriving line intersection data associated with an intersecting portion between each edge of each of the triangles to be drawn and each scan line, said line intersection data including a first pair

of outside intersection and inside intersection that represent intersecting positions between said each scan line, said line intersection data including a first pair of outside intersection and inside intersection that represent intersecting positions between said each scan line and one of the edges that is located on an upstream side as viewed in a scanning direction, a second pair of outside intersection and inside intersection that represent intersection positions between said each scan line and one of the edges that is located on a downstream side as viewed in the scanning direction, an increasing rate at which an intensity value increases from the outside intersection to the inside intersection of said first pair, and a decreasing rate at which the intensity value decreases from the inside intersection to the outside intersection of said second pair; and

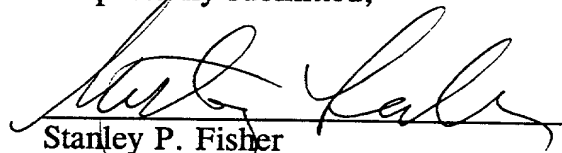
a scan line processing step of sequentially calculating the intensity value to be given to each portion of each of the triangles in the scanning direction with respect to each scan line, based on the line intersection data obtained for said each scan line by said edge calculating step.--

#### **REMARKS**

Prior to the examination of the above-referenced application on the merits, the Examiner is respectfully requested to amend this application as outlined above. Applicant has amended the claims in order to remove the multiple dependencies contained therein. Applicant hereby submits that no new matter has been added to the application as a result of this amendment.

In view of the above remarks and Applicant's amendment of the claims, the Examiner is respectfully requested to proceed with the examination on the merits of this application, to indicate the allowability of the claims and to pass this case to issue.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Stanley P. Fisher", written over a horizontal line.

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July 7, 1998